

Three new species of *Ptilotus* (Amaranthaceae) from Western Australia

By G. Benl*

Abstract

Three new species of *Ptilotus* from Western Australia are characterised and figured, namely *P. kenneallyanus*, *P. beardii* and *P. decalvatus*. Their affinities to other taxa are considered.

1. *Ptilotus kenneallyanus* Benl sp. nov. (Figures 1 and 2)

Diagnosis. Planta fruticulosa ad 40 cm et ultra alta, partibus vegetativis leviter tomentosulis denique glabrescentibus, spicis permultis pedunculatis vel sessilibus, saturrime roseis speciosa.

Differt a *P. obovato* (Gaud.) F. Muell. praesertim habitu densiore, pubescentia inaequali, tepalis subtus carinatis, staminibus duobus tantum completis.

The more densely branched growth, a slighter, uneven, evanescent pubescence on stems and foliage as well as some differences in floral structure render this subshrub positively distinct from *P. obovatus* (Gaud.) F. Muell. in each of its varieties.

Type: Edgar Ranges (123°27'E, 18°55'S), south-east of Broome; coll. K. F. Kenneally 5412, 4 August 1976 (holotype: PERTH; isotypes: CANB, M, PERTH).

Description. A red-spiked spectacular bushy plant (Figure 1 A) spreading to 30 cm across, short-hairy on all surfaces of juvenile stems and leaves, the uneven vestiture (especially on shoots) composed of small irregular branched substellate hairs, of elongated (up to 2·3 mm long) denticulate or distinctly verticillate to dendroid ones, and of transitional forms indefinitely shaped, somewhat resembling *P. remotiflorus* Benl in this respect (s. Mitt. Bot. München 12: 335, 1976).

Rhizome (root?) fusiform, at least in young specimens. *Stem* ca 6 mm diam. at base, dividing into several patent to (sub)erect branches from under 10 to over 40 cm high, dichotomously or paniculately branching repeatedly. The obtusely 4-angled branches and the flexuose angular-curved terminal branchlets (Figure 2 A), about 30 per plant, greenish, grey-puberulous when young, all floriferous, their apices becoming the peduncles and rachises of the spikes.

Leaves greyish to pale green, 3–5 cm apart in the lower branches and branchlets, less than 2 cm apart in upper portions, subrhombic-ovate to spatulate, up to 5 cm long and 2·5 cm wide but usually much smaller, coriaceous, at first densely hairy on both surfaces, at length becoming subglabrous; laminae entire with a conspicuously prominent midvein beneath, the rounded apex shortly mucronate (with a mucro ca 0·7 mm long), the base (gradually) narrowed into a petiole well-defined only in the lower leaves and up to 1·5 cm long; the uppermost leaves subsessile.

Inflorescences profuse, iridescent purplish-pink to pinky-mauve when fresh, terminal as well as pedunculate to (sub)sessile in the axils and on lower stems (Figures 1 A, 2 A); lateral peduncles right-angled at times and up to ca 2 cm long. Spikes initially depressed globose, but later obovoid and oblong-obovoid, attaining fully 2·5 cm long, 1·5 cm wide, with 15 to 20 (to 25) shortly pedicellate flowers.

Flowers crowded along thin, red, zig-zag rachis; pedicels ca 0·8 mm, densely clothed with verticillate hairs up to 1·2 mm long.

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Bracts and bracteoles membranous, entire, keeled, acuminate, the brownish midrib elongated into an arista-like point 0.8–1.1 mm long, persistent. *Bract* (narrow-)ovate, (4.5–) 5 x 1.5 (–1.8) mm, gradually tapering into the acumen, dorsally clothed (except for the basal lateral parts) with denticulate to verticillate hairs ca 2 mm long, never reaching the apex (Figure 2 B). *Bracteoles* hyaline and shiny, broadly ovate, (5–) 5.5 x 2.2 mm, hirsute only along the prominent midrib (Figure 2 C).

Perianth erect later subcampanulate, plumose on the back with stiff verticillate hairs initially deep purplish later fading to pink, tube indurated,

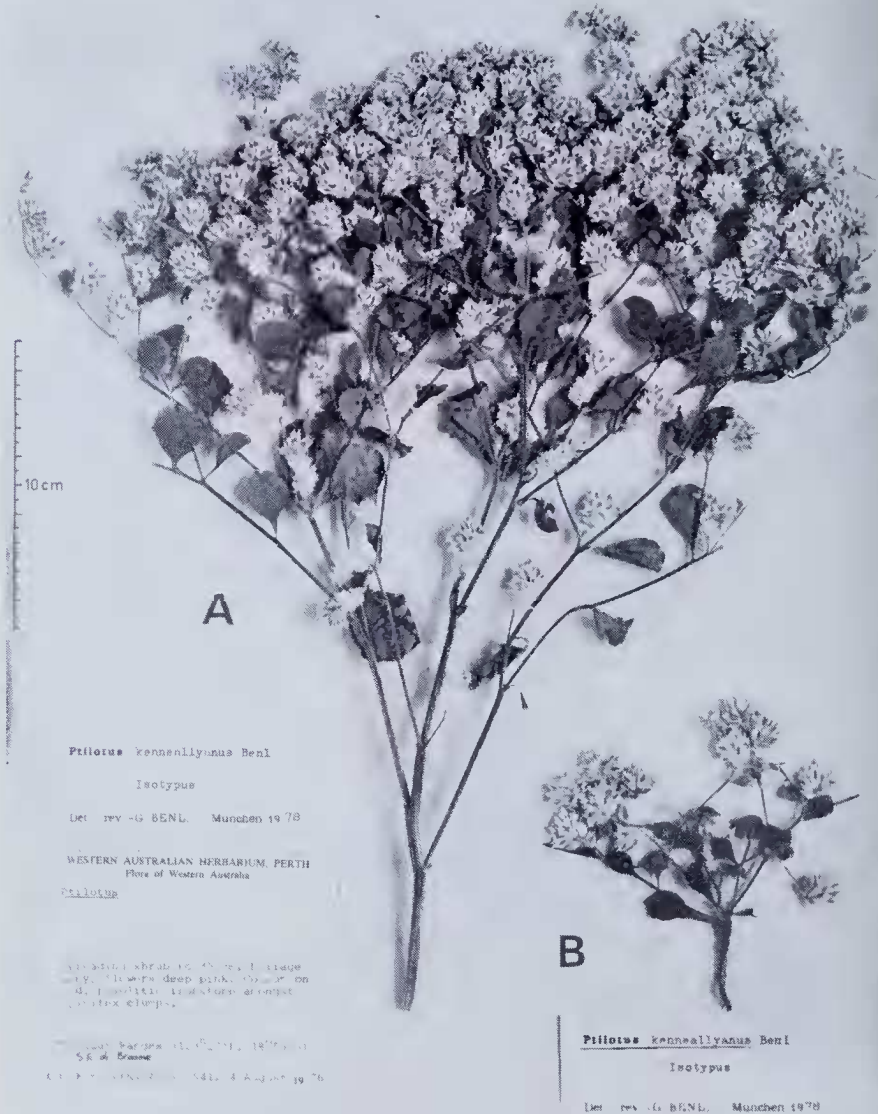


Figure 1. *Prilotus kenneallyanus* Benl. (K. F. Kenneally 5412) (phot. K. Liedl).

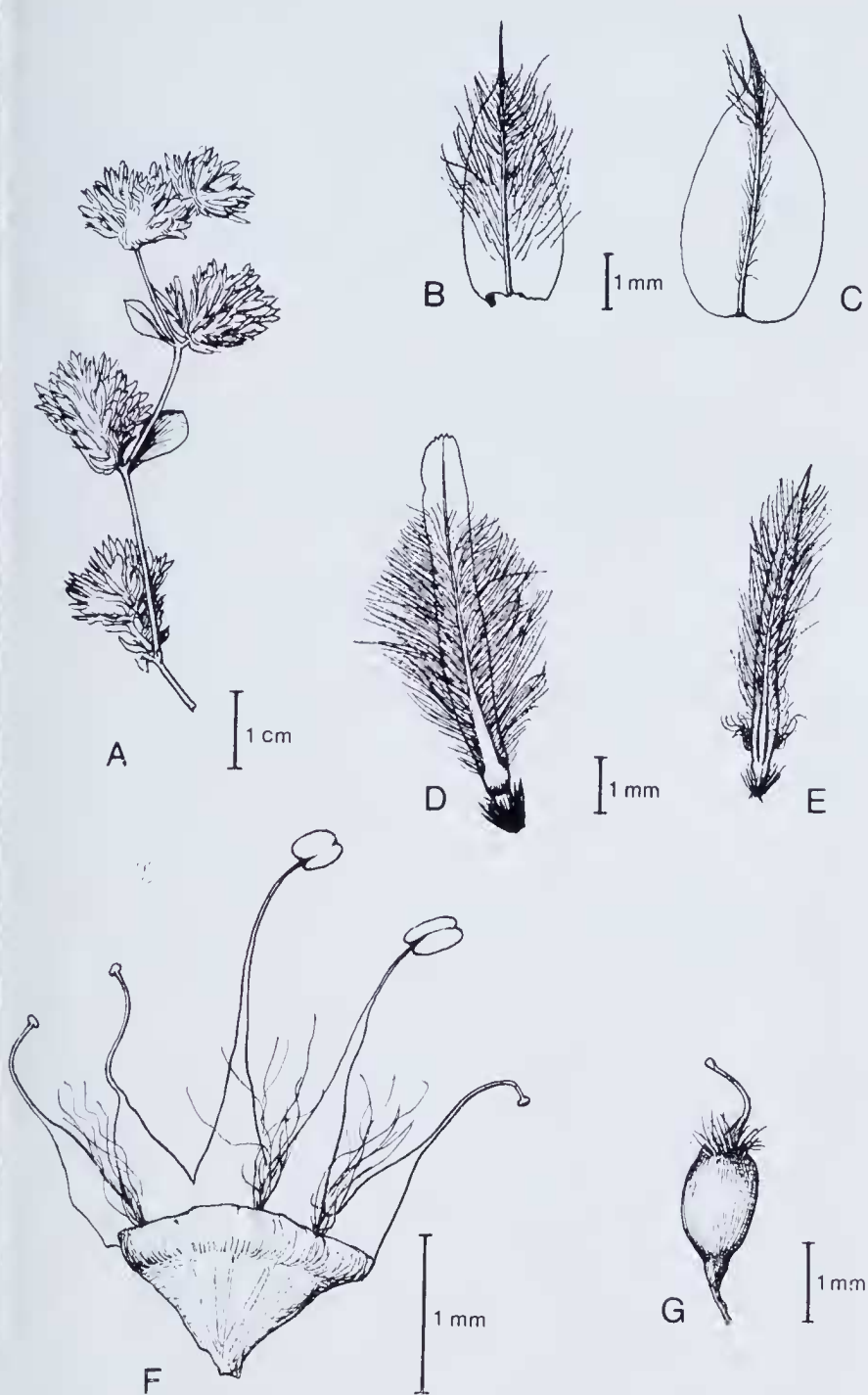


Figure 2. *Ptilotus kenneallyanus* Benl. A—Terminal branchlet. B—Bract, outer face. C—Bracteole, outer face. D—Outer tepal, outer view. E—Inner tepal, outer view. F—Androecium spread open, outer view. G—Gynoecium. (Drawn by A. Böhm.)

turbinate ca 1 mm long, up to 0.4 mm wide, surrounded at base by a dense tuft of simple bristly hairs about 0.7 mm long and more or less irregularly septate.

Tepals conspicuous with their glabrous red shining apices not exceeded by the copious external snow-white hairs, 3-nerved with a distinct median vein and two fainter marginal ones; the broad ridge above the tube glabrous in its lower part of about 1.2 mm. *Outer tepals* 7–7.5 mm long and 0.8 mm broad near the middle, the apex 2.8–3.1 mm long, glabrous in its upper 2 mm, subspathulately dilated to 1.2 mm, apex rounded to sub-truncate, minutely serrate; dorsal hairs articulate (finely denticulate to verticillate), up to 2.8 mm long and markedly decreasing in length towards the base (Figure 2 D); internally glabrous throughout. *Inner tepals* 5.8–6.5 mm long and ca 0.5 mm broad near the middle; the apex 1.2–1.8 mm long, glabrous, dilated to 0.8 (–1.0) mm, but mostly inrolled, subacute, scarcely reached by the dorsal vestiture; inside with a faint beard of thinner, crisped, nodose hairs along both (rarely one) edges above the tube; the basal ridge more sharply bordered (Figure 2 E).

Two adjacent *stamens* consistently fertile, filaments flattened, 1.6–2.2 mm long, ca 0.1 mm broad in the middle, subulate above and markedly (to 0.3–0.45 mm) dilated below; the three *staminodes* mostly shorter subequal, bearing a minute button-like rudimentary anther, filiform and curling upwards at times and often more abruptly broadened downwards to the same extent as the fertile ones (Figure 2 F). Stamens and staminodes fused into a turbinate cupula strongly adnate to the perianth tube, with a free membranous, sometimes asymmetrical ring to 0.25 mm high, with fascicles of curly nodose hairs 1.2 mm long outside at the base; sinuses acute; no pseudo-staminodial lobes. *Anthers* very broadly elliptic, ca 0.3 x 0.2 mm.

Pistil moderately stipitate. *Ovary* more or less club-shaped to subglobose, finally up to 2.4 mm long, the 0.3–0.4 mm long stipes included; pubescence of rigid articulate hairs up to 0.3 mm long, occupying the upper half of the juvenile ovary, limited toward its top in mature stage. *Style* 1.0–1.3 mm long, to 0.1 mm in diameter, eccentric and always shortly hairy on its thickened base (Figure 2 G). *Stigma* capitellate becoming inconspicuous with the age.

Habitat. "Common on red, pisolitic ironstone amongst spinifex clumps" (K. F. Kenneally).

Specimens examined

Apart from the type material (five large specimens each consisting of a branch such as shown in Figure 1 A and two small specimens such as in Figure 1 B) there is a previous collection of J. S. Beard (4105, 13 May 1965, Dampier Downs, Edgar Ranges), comprising four specimens, two of them (on a single sheet) lodged at NSW, one at PERTH and one at K. These samples are reduced variants ("small shrub, 3 in.–6 in.") of the new taxon, evidently grown in a more barren soil, differing from Kenneally's younger specimens in having a thicker stem (NSW) and larger leaves (K, NSW, PERTH); the pubescence and floral features match those of the type material.

Discussion. The resemblance to *P. obovatus* (Gaud.) F. Muell. seems to be merely a superficial one, as already indicated in the diagnosis above. It is difficult to assess whether the plants are perennial, since the smaller isotype (7.5 cm tall, 10 cm across) has a considerable number of inflorescences (Figure 1 B), and the taxon thus displays a range of variation in size uncommon in perennials in general and unknown in *P. obovatus* in particular.

The upper floriferous branchlets may form a right angle as is often the case with *P. obovatus* which, however, produces only terminal corymbose panicles, not isolated spikes in lower parts of the branches as shown in Figure 1 A. In *P. obovatus* var. *obovatus* with its dense, persistent tomentum the hairs

on stems and especially on leaves are stellate and uniform; also in other varieties of this species vestiture is far more uniform and persistent than in *P. kenneallyanus*.

As regards floral structure, the basally dilated filaments are characteristic of *P. aristatus* Benl, *P. eichleranus* Benl, and *P. chippendalei* Benl, all of which constantly have two fertile stamens. These species, however, are completely different in habit.

This new, distinctive *Ptilotus* does not have close affinities with any other species of the genus known so far.

Name. The novelty is named after Mr. Kevin F. Kenneally, botanist of the Western Australian Herbarium, South Perth.

2. *Ptilotus beardii* Benl sp. nov. (Figures 3 and 4)

Diagnosis. Fruticulus ca 45 cm altus; ramuli terminales (sicut foliola subarachnoidei-pilosi, denique glabrescentes) loco pedunculorum in rhachidem brevem transeunt et spicas solitarias hemisphaericas paucifloras gerentes. Flores spectabiles tepalis ad 1.8 cm longis apicibus glabris malvinis; filamenta staminum fertilium basim versus haud dilatata, cupula staminalis dense ciliata; ovarium glaberrimum.

A *Priloto polakii* F. Muell. et a *P. parvifolio* (F. Muell.) F. Muell. (var. *laeto* Benl incluso) praecipue inflorescentia ampliore et longius pedunculata, pubescentia diversa, bracteolis bractea manifeste maioribus distinctus.

Readily distinguished from *P. polakii* and *P. parvifolius* by its more spreading habit, different indumentum, larger but at most 8-flowered spikes on long peduncles (Figure 3), the bracteoles larger than the bracts (Figures 4 A, 4 B), the filaments of the fertile stamens not dilated at the base, and the straight cupule.

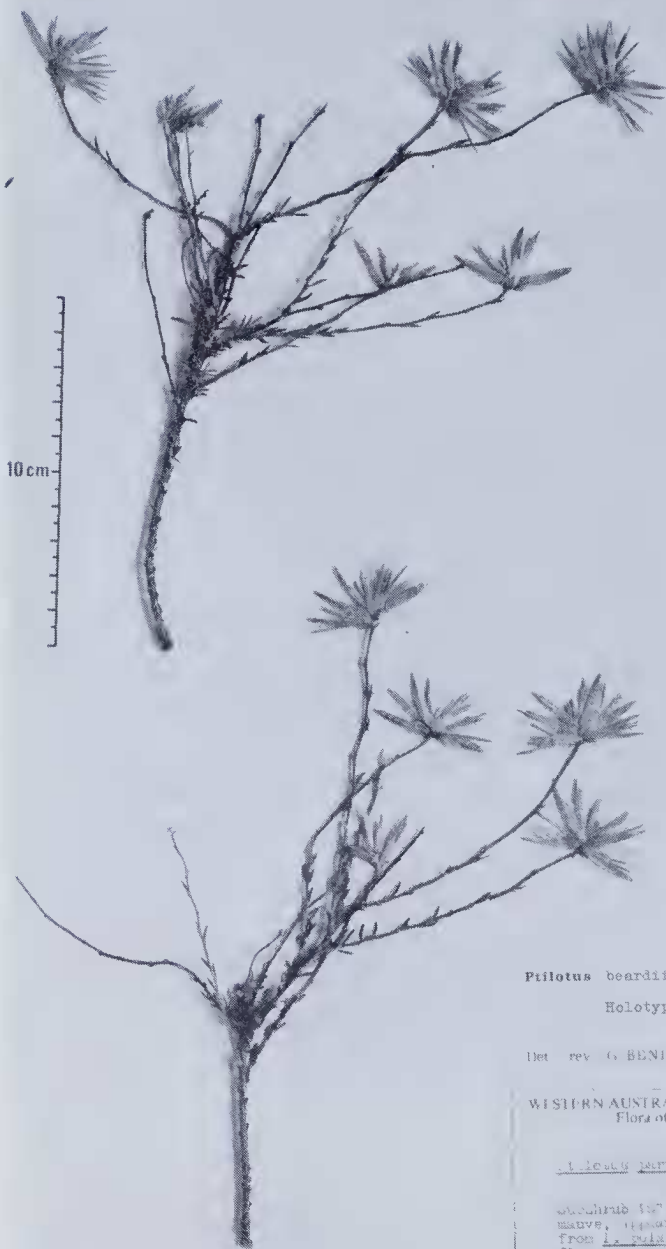
Type: Muggon Station (115 32'E, 26 37'S), on salt flats: coll. J. S. Beard 6859, 17 Oct. 1973 (holotype: PERTH; isotypes: M. NSW, PERTH). "Subshrub 18 in., flowers mauve, appears to differ from *P. polakii*."

Description. A much-branched, rigid subshrub to 45 cm or more tall, pubescent with a cobweb-like thin indumentum of irregularly denticulate, bent, slightly appressed hairs up to 0.6 mm long on younger greyish-green shoots and leaves (equally on both surfaces) becoming glabrescent with age; bark on lower stems (to 6 mm diam.) dark. Root and stem base not seen. Branchlets divaricate.

Leaves alternate, 2–6 mm apart, erect-spreading, very small (10 x 1.2 mm) to minute (4 x 0.8 mm), distinctly mucronate (with mucro ca 0.7 mm long), sessile but with a callose yellow decurrent base ca 1.5 mm long, lamina entire, firm, the midrib becoming prominent with age. Older leaf axils with a tuft of rather straight jointed hairs (0.8–1.0 mm); new leaves mostly 3–5-clustered in axils.

Spikes of 5 to 7 (8) flowers, hemispherical, 3.2–3.8 cm across, terminal. Rachis short, 2–3 mm long, densely villous, the hairs 0.5 mm long, not appressed.

Bracts and bracteoles membranous-scarious, keeled: midribs prominent, reddish-tinged, produced into rigid apices; margins indistinctly denticulate toward the end; bract ovate ca 5 x 2.2 mm with an awn 0.7–1 mm long, honey-coloured but densely hairy throughout at first (Figure 4 A); bracteoles broadly ovate, concave, 7.5 x 4 (–5) mm with an awn 1.0–1.1 mm long, colourless, translucent lustrous, the pubescence more or less limited toward the keel (Figure 4 B), of tiny but clearly dendroid-verticillate hairlets.



Pilolotus beardii Benl

Holotypus

Det. rev. G. BENL., München 1978

WESTERN AUSTRALIAN HERBARIUM, PERTH
Flora of Western Australia

Pilolotus brevifolius (F. Muell.) F. Muell

Shrub 1 m, flowers
mauve, upward to diff.
from *P. pulchellus*, on diff.
flora.

Loc. Nuyon Station.

Coll. J. S. Beard 6859

17 October 1973

Figure 3. *Pilolotus beardii* Benl. (J. S. Beard 6859) (phot. K. Liedl).

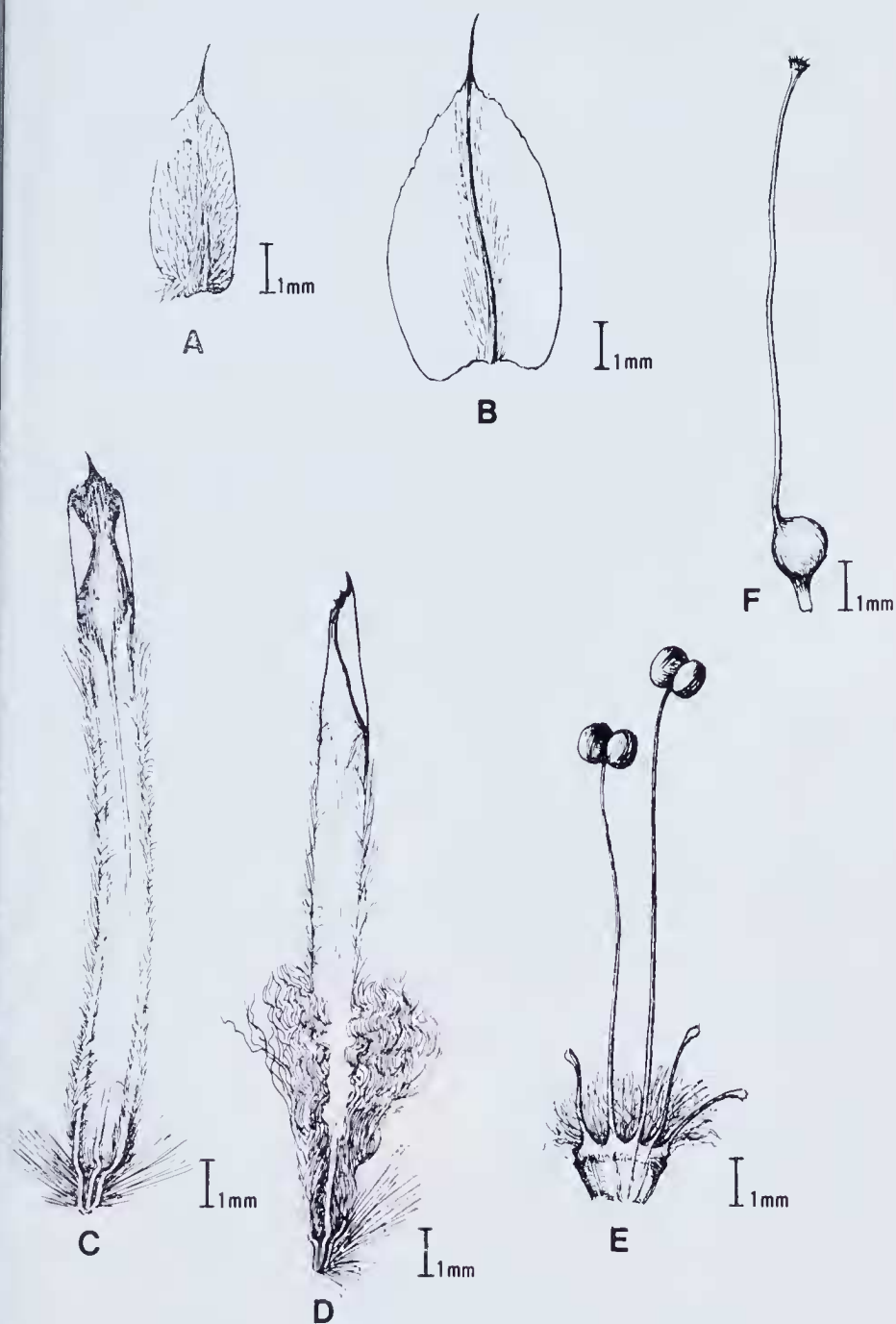


Figure 4. *Prilotus beardii* Benl. A—Bract, outer face. B—Bracteole, outer face. C—Outer tepal, inner view. D—Inner tepal, inner view. E—Androecium spread open, inner view. F—Gynoecium. (Drawn by A. Böhm.)

Perianth elongated, rigid, erect but later divergent, the exposed glabrous tepal ends coloured, base constricted to a small turbinate tube, hardened, 0.8–1 mm long, obscured by the stiff dorsal hairs (to 2 mm long) of the basal pubescence.

Tepals linear, invested outside along the centre with firm, straight, jointed and subdenticulate hairs, up to 7.5 mm long in lower half but never reaching the apices (Figure 4 C and 4 D); strongly short-ciliate at the margins with delicate hairs ca 1–1.5 mm long (increasing somewhat in length toward the base) and sharply dendroid-verticillate; these underlying the dorsal vestiture for the most part and often turned in from the margins against inner surface of the tepals; three nerves fairly conspicuous inside especially in the thickened base.

Outer tepals (Figure 4 C) 1.5–1.7 cm long and up to 1.3 mm broad above the tube; apex glabrous, reddish, ca 2.5 mm long, often prolonged another 1–1.5 mm down the margins, subspathulately dilated to about 2 mm but mostly incurved, apically erose-serrulate with a central mucro; the lamina greenish, glabrous inside except for the marginal cilia mentioned above, the central nerve prominent inside.

Inner tepals (Figure 4 D) somewhat smaller, usually strongly inrolled towards the apices—hence appearing more acute in outline—bearing inside above the tube a flexuose indumentum of crisped weakly nodose hairs up to 7–8 mm long, twisted between the nodes and more or less intricate with each other, rising marginally on one or on either side.

Only two adjacent *stamens* fertile (Figure 4 E), their slightly flattened upright filaments 8.5 to 12 mm long and up to 0.3 mm wide in the middle, abruptly subulate below the anthers and not dilated in lower portions except for the very base; *staminodes* reduced to 1–3 mm in length and hidden in part among the copious hairlets up to 1.3 mm long and distinctly nodose, surrounding the staminal cup (ca 1.6 mm high) on its outer distal face, regularly bordering the free ring up to 0.6 mm high and not oblique. No pseudo-staminodes present. *Anthers* yellow, almost globose, 0.9–1.0 mm in diameter.

Pistil shortly stalked, the stipes 0.6–0.8 mm in length. *Ovary* club-shaped entirely glabrous, 2.2–2.8 x 1.0–1.4 mm (including the stipes). *Style* lateral (Figure 4 F), straight, slender, up to 11 mm long and ca 0.12 mm diam. in the middle, scarcely thickened downwards. *Stigma* capitellate, papillose, more or less level with the anthers.

Discussion. The new taxon is based on one collection consisting of five fragments. It bears some resemblance to other low, shrubby species with woody stems—i.e. *P. parvifolius* (F. Muell.) F. Muell., *P. polakii* F. Muell., *P. remotiflorus* Benth—characterised by sparsely tomentose shoots, more or less persistent bases of the leaves, a hirsute staminal cup and an eccentric style. However, none of these plants ever develops the large long-pedunculate spikes broader than long and evidently not becoming ovoid, as shown by the new taxon; in addition, the bracteoles of the new species are considerably larger than the bracts and the tepals conspicuously narrower than in any allied species. The cobweb-like indumentum does not occur in related species.

P. remotiflorus from the Gregory North District (Queensland) is unique for its extremely heterogeneous pubescence, and its ovary being distinctly hirsute toward the summit. In *P. polakii* the staminal ring is very oblique, its ovary long-stipitate, the pubescence of the shoots is more or less restricted to leaf axils; and the leaves are larger and broader. *P. parvifolius* has glaucous branches and (sub)glabrous bracts. In the var. *parvifolius* the tepals are ciliate at the margins with shorter hairs, and the dense dorsal indumentum projects to or beyond the apices of the tepals, thus rendering the flowers very different from those of *P. beardii*. In *P. parvifolius* var. *laetus* the tepals are broadly limbate.

Both *P. polakii* and *P. parvifolius* have shorter pointed bracts and bracteoles and (finally) drooping anthers; in the structure of the staminal cup *P. beardii* seems to be closer allied to *P. parvifolius* than to *P. polakii*.

The new taxon diverges in so many respects that there is sufficient evidence to justify its specific rank.

Name. The specific epithet honours the collector, Dr. John S. Beard. Through his valuable collections especially from the North West many rare taxa of *Ptilotus* have become better known to science.

3. *Ptilotus decalvatus* Benl sp. nov. (Figures 5 and 6)

Diagnosis. Herba annua caulibus erectis rubescentibus ramosis, foliis mox glabris angustissime linearibus, spicis subrotundis denique cylindraceis, floribus densis. Bractee bracteolaeque parvae glabrae; tepala praecipue apicem versus parce pilosa, pilis scaberulis minutis caducis, tandem decalvata; stamina omnia fertilia, cupula et ovarium glaberrimum.

Pubescentia unica inflorescentiae ab omnibus speciebus adhuc cognitis recedit.

Erect laxly branching annual of medium size (Figure 5), younger parts of shoots finely tomentose with curled rough hairs; leaves inconspicuous, the loosely paniculate spikes subglobose at length shortly cylindrical, up to 3.5 cm long; tepals with white fragile hairs mainly toward the apex, scarcely visible without a lens and soon breaking off, thus giving the apex of the tepals a white bald-headed aspect, as long as these are dark-coloured (Figure 6 B). This characteristic pubescence on the floral organs serves to separate the new plant principally from all other known species of the genus.

Type: Byam Martin Island, Bonaparte Archipelago (124°22'E, 15°24'S), growing in alluvium; coll. *P. G. Wilson* 11513, 11 July 1973 (holotype: PERTH; isotypes: M, PERTH).

Description. Herbaceous species up to 40 cm tall; producing from a slender tap root (to 3 mm diam.) a striate stem which may divide near ground level into several rigid main branches measuring up to 30 cm in length and 1 to 1.5 mm in diameter near the middle, becoming reddish-tinged and irregularly divided again (Figure 5). Branches and branchlets tomentose-pubescent when young (Figure 6 A) with whitish crisped hairs 0.1–0.25 mm long and remarkable for their very rough granulate to tuberculate surface, later glabrescent.

Leaves pale green, narrow-linear to almost filiform, 1 to 4.5 cm apart, up to 4.5 cm long, 0.5–0.8 mm wide in the lower part of stems, ca 1 cm long below the terminal spikes, distinctly mucronate-acute (mucro excurrent 2 mm long), scarcely attenuate at the base, at first pubescent, becoming glabrous; midrib not prominent beneath.

Spikes compact, rigid (Figure 6 B) at first subglobose (ca 0.8 cm in diameter), becoming ovoid to cylindric (1.5–3.5 cm long) with age, dark mauve to (brownish) red when fresh, fading at length to cream; forming congested to diffuse panicles terminating main and lateral branches, as well as sessile and axillary; spikes in general single but sometimes divided with 1–2 smaller divergent spikes at the base. Flowers varying from 30 to about 80.

Rachis with short pedicels (ca 0.5 mm long) hidden among a villous pubescence consisting of tuberculate to indistinctly verticillate hairs which are curved, intricately crisped, to 1.2 mm long. Flower-axis articulate above the bracteoles.

Bracts and bracteoles very inconspicuous, concave, entire, membranous-scarious, yellowish, shining, 1-nerved, persistent after fall of perianth, unequal: bract oblong-ovate, slightly acute, 1.5–1.7 x 0.6 (–0.8) mm, with a blunt keel

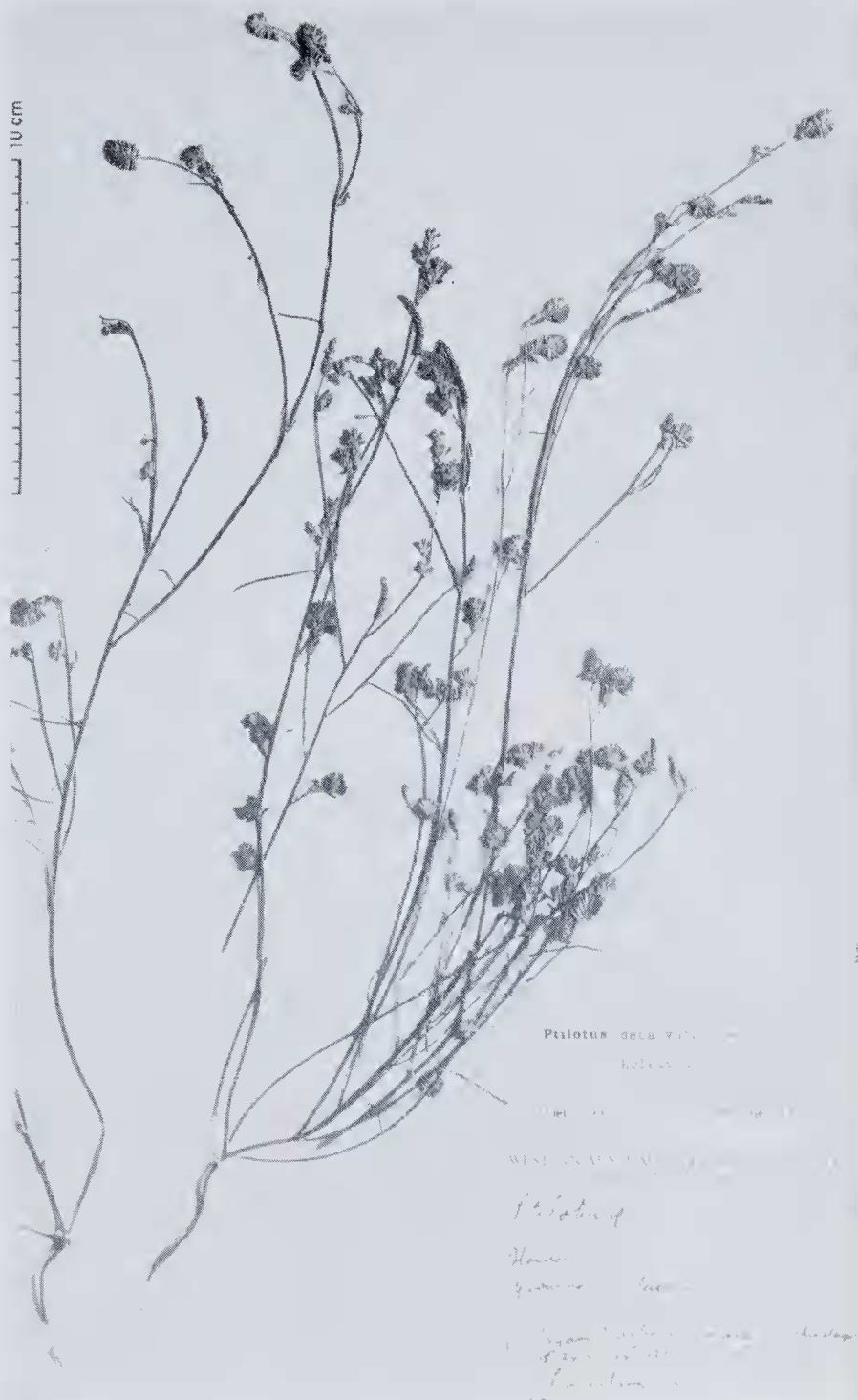


Figure 5. *Ptilotus decalvatus* Benl. (P. G. Wilson 11513) (phot. K. Liedl).

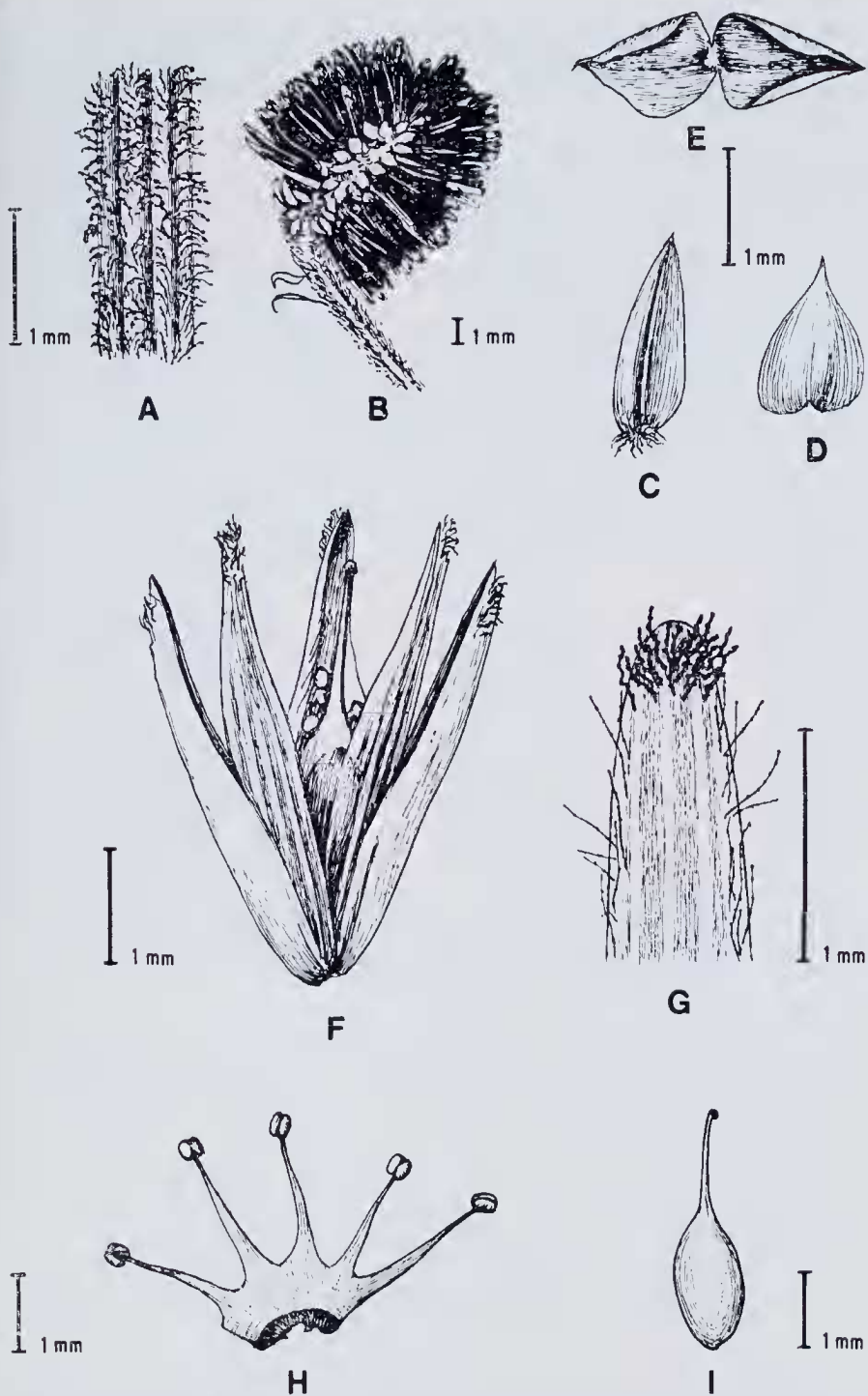


Figure 6. *Ptilotus decalvatus* Benl. A—Segment of a young branch. B—Terminal spike. C—Bract, outer face. D—Bracteole, outer face. E—Bracteoles pressed down, inner face. F—Perianth, side view. G—Top of inner tepal, outer face. H—Androecium cut open, inner view. I—Gynoecium. (Drawn by A. Böhm.)

faintly woolly toward its base (Figure 6 C). Bracteoles shorter (0.7–0.9 mm) but broader (0.9–1.1 mm), glabrous and wholly transparent (Figures 6 D and 6 E), imbricate, completely embracing the perianth in its lowest part; midrib not prominent.

Perianth mauve to reddish with a very low and somewhat notched basal disc formed by the lowermost portions of the tepals; base callose inside; apices subobtusate, concave. All *tepals* finally subequal in length, glabrous internally, bearing a scanty outer apical pubescence; the hairs straight, 0.3–0.4 mm long, stout, tuberculate, soon breaking off. *Outer tepals* rigid, boat-shaped (Figure 6 F), up to 4.2 x 1 mm, scarcely or slightly margined, more or less sharply keeled and diverging in anthesis, the scanty pubescence restricted to the uppermost part. *Inner tepals* somewhat broader and flatter, varying in details of shape but regularly 3-ribbed in their median area, the membranous marginal zone up to 0.45 mm wide; beside the apical hairlets there are somewhat longer (up to 0.6 mm) but thinner ones (i.e. looking less tuberculate under the microscope) developed along the margin, more scattered and appressed (Figure 6 G).

All *stamens* constantly perfect; filaments slightly flattened and dilated toward their base, 1.4–2 mm long, to 0.2 mm wide near the middle and broadened to 0.4–0.6 mm, fused below into a comparatively high (ca 1 mm) and free, membranous, broadly turbinate cup (Figure 6 H), attached to the perianth disc by its lowest portion (ca 0.3 mm). *Anthers* broadly elliptical, 0.18 x 0.12 mm.

Pistil (Figure 6 I) almost sessile when fully developed, entirely glabrous. *Ovary* up to 1.3 mm long and 0.6 mm across. *Style* central, straight, ca 1.2 mm long and thickened downwards. *Stigma* subglobose.

Specimens examined

Western Australia: N. W. Coast, *De Bonley*, s.n., no date—BM. This plant was misidentified as "*Ptilotus roseo-albus* Farmar" with reference to the type at Kew Herbarium. But the type specimen of this taxon clearly shows the close alliance to *P. gomphrenoides* F. Muell. ex Benth., having a dense woolly indumentum on the perianth.

Lat. 18°10', Long. 122°26', *A. Forrest & T. Carey*, s.n., 1879—MEL (77349) Heywood Islands (southern island), Bonaparte Archipelago, "growing in *Acacia* scrub on sandstone", *P. G. Wilson* 10904, 22 May 1972—PERTH.

Byam Martin Island, Bonaparte Archipelago, 124°22'E, 15°24'S, *P. G. Wilson* 11513 (typus), 11 July 1973—M, PERTH.

Discussion. To some extent the above described plant approaches *P. conicus* R. Br. and *P. corymbosus* R. Br. in general habit. *P. conicus*, however, is markedly separated from all other species of the genus by the peculiar structure of the androecium, while *P. corymbosus* (with its stronger corymbose aspect) belongs to a group of *Ptiloti* with bipartite inner tepals.

Hairs resembling the rough-walled ones of the new species are to be seen in the yellowish indumentum of *P. arthrolasius* F. Muell. They have a similar seabrid appearance, but are clearly sebate—with sometimes smooth walls of the internodes especially toward their apices—and are more or less restricted to stems and foliage. The perianth is characterized by long silky trichomes up to 7 mm in length and widely exceeding the tepals. This species is not closely related to *P. decalvatus*. The same is the case with *P. forrestii* F. Muell. allied to *P. arthrolasius*.

With regard to the pubescence of the tepals there seems to be some resemblance to *P. lophotrichus* Benl. In the latter species the tepals have an apical tuft of relatively few hairs. But in that species the apical hairs are much longer (to 2 mm), jointed and smooth; the outer and inner tepals bear short crisped hairs at their external base, the inner ones—markedly narrowed below—are

moreover woolly inside. The unusually large bracts and bracteoles likewise have tufts of straight hairs exceeding the apex, whereas in *P. decalvatus* these organs are very small and entirely glabrous. There are other significant differences.

Nevertheless the relationship of the new plant to *P. lophotrichus* (and perhaps even to *P. lanatus* A. Cunn. ex Moq.) may be closer than to *P. conicus* and *P. corymbosus*, respectively, whilst on the other hand there are such well-defined characteristic features of the new taxon that its specific rank is justified.

Name: The specific epithet, meaning "become glabrous", refers to the tepals, in which the sparse pubescence soon wears off.